

FINGER SHIELD AND SUPPORT FOR SPLIT-FINGERED GLOVE

Field of the Invention

[0001] The present invention relates to gloves, particularly to gloves for sports.

Background of the Invention

[0002] Gloves may be used to prevent or minimize damage to hands, including fingers, during activities that pose a risk of injury to the hands. Activities such as sports, for example hockey (e.g. ice hockey, roller hockey, field hockey, etc.), lacrosse, football, cricket, etc., may be particularly hazardous activities and people go to great lengths to protect all parts of the body, including the hands during such sports. Contact sports and sports that require the use of sticks, such as hockey and lacrosse, require even greater protection for the hands, including the fingers, than other sports.

[0003] Recently, so-called split-fingered hockey gloves have been designed to provide greater flexibility of hand movement so that a player has better feel and control over a stick. An example of such a glove is described in United States Patent 5,488,739 issued February 6, 1996 to Cardinal. Split-fingered gloves are designed with discontinuous padding on the finger portions of the glove so that the fingers of the glove can bend more easily at articulations formed at or near the finger joints. While this arrangement permits greater flexibility and control of hand motion, it also reduces protection surrounding the finger joints and reduces support against twisting with respect to the ends of the fingers. Thus, there is an increased likelihood of hand injury from impact with other sticks, with bodies, with boards, with the playing surface or other obstacles in the playing area.

[0004] In order to ameliorate this problem, extra material has been added into the articulations, usually in the form of loops of glove material, for example leather. While this provides some protection for the finger joint, these efforts do not provide sufficient

shielding to adequately protect the finger from injury due to impacts at the joint, nor do they provide support against twisting of the fingers.

[0005] Thus, there remains a need to provide a split-fingered glove, which benefits from the flexibility offered by the split-fingered design, but also protects fingers from impact and/or twisting, particularly at the finger joints.

Summary of the Invention

[0006] There is provided a split-fingered glove comprising: a hand-receiving portion for receiving a hand; and, one or more padded finger-receiving portions extending from the hand-receiving portion, one or more of the finger-receiving portions having one or more flexible articulations at a back thereof and having a shield or shields over the one or more articulations to protect one or more finger joints, the shield or shields being engaged with and slidably constrained by the finger-receiving portion, the shield or shields sliding in response to curling and uncurling the hand.

[0007] There is further provided a hockey glove comprising: a hand-receiving portion for receiving a hand; and, four padded finger-receiving portions extending from the hand-receiving portion, each finger-receiving portions having, at a back thereof, one flexible articulation having a shield or shields thereover to protect a finger joint, the shield or shields being engaged with and slidably constrained by the finger-receiving portion, the shield or shields sliding in response to curling and uncurling the hand.

[0008] There is yet further provided a hockey glove comprising: a hand-receiving portion for receiving a hand; and, four padded finger-receiving portions extending from the hand-receiving portion, each finger-receiving portions having, at a back thereof, two flexible articulations having a shield or shields thereover to protect a finger joint, the shield or shields being engaged with and slidably constrained by the finger-receiving portion, the shield or shields sliding in response to curling and uncurling the hand.

[0009] As used in the specification and the appended claims, the singular forms "a," "an" and "the" include plural referents unless the context clearly dictates otherwise.

[0010] In the context of the present invention, one skilled in the art understands that a split-fingered glove refers to a glove having discontinuous padding along a finger or fingers. Split-fingered gloves encompass gloves having a single finger-receiving portion, such as in a mitten, or having a plurality of finger-receiving portions, such as in a standard hockey glove, for example the glove described in United States Patent 5,488,739. It is understood that the thumb is a separate digit, which has its own thumb-receiving portion.

[0011] When a hand is curled within a glove, material on the back of the glove, including the hand-receiving portion and the finger-receiving portion, must stretch to accommodate the curling of the hand. Such stretching is more difficult when the back of the glove is padded. Thus, padding a glove in an effort to provide better protection also restricts the ability to curl the hand thereby restricting mobility and flexibility of the hand in the glove. In order to provide increased flexibility, the finger-receiving portions of split-fingered gloves may be formed with flexible articulations at the back at or near one or more finger joints. Thus, there is a break in the padding at the back of the finger-receiving portions thereby exposing finger joints to injury and weakening support against twisting of the end of the finger-receiving portions.

[0012] In a split-fingered glove of the present invention, a shield is placed over the articulations to protect the finger joints from injury and/or to provide support against twisting of the finger. The shield is engaged with and slidably constrained by the finger-receiving portion, and the shield slides in response to curling and uncurling of the hand while still remaining positioned over the articulation. Thus, the flexibility enjoyed from a split fingered glove is not lost while the protective benefit of the shield is retained at all times.

[0013] As mentioned above, a split-fingered glove may have one or more finger-receiving portions. The thumb-receiving portion is generally considered separate from the finger-receiving portion. Generally, but not necessarily, when a split-fingered glove is padded, the thumb-receiving portion is provided with continuous padding along the back, therefore, the thumb-receiving portion generally does not require a shield as contemplated by the present invention. However, it is contemplated within the scope of the invention that the thumb-receiving portion could also have a shield if desired. One or more of the finger-receiving portions in a padded split-fingered glove are provided with discontinuous padding along the back thereby forming flexible articulations at or near finger joints which would benefit from a shield as contemplated by the present invention.

[0014] The split-fingered glove may have one finger-receiving portion for all four of the fingers, in which case a single shield spanning all four fingers may be conveniently used. However, even when there is only one finger-receiving portion for all four fingers, it is possible to have individual shields for each finger. Alternatively, the glove may have four separate finger-receiving portions for each finger, in which case individual shields may be used for each finger, although a single shield spanning all four finger-receiving portions is still possible. Any combination of the number of finger-receiving portions and the number of shields may be contemplated within the scope of the present invention. In a typical split-fingered hockey glove, there is an individual finger-receiving portion for each finger and it is preferred that each finger-receiving portion have its own shield.

[0015] Each finger has more than one joint. A split-fingered glove may be designed to articulate at or near one or more of the joints of the finger. Providing articulation at or near more than one finger joint provides greater flexibility for the hands but also reduces the amount of protection and support for the fingers. When there is more than one articulation in a finger-receiving portion, a single shield may be provided which is

long enough to cover all articulations and therefore protect all of the finger joints of the finger. Alternatively, a separate shield may be provided for each articulation.

Combinations of single shields and multiple shields may also be used.

[0016] In order to maintain flexibility of the hand provided by a split-fingered glove, the shield in a split-fingered glove of the present invention is engaged with and slidably constrained by the finger-receiving portion in response to curling and uncurling of the hand. The shield may be engaged with and slidably constrained by the glove by any suitable means. For example, the shield may be within a sleeve or sleeves of material formed into or onto the material that covers the glove, the shield may be within a pocket or pockets formed into the padding of the glove, the shield may be between the material that covers the glove and the padding of the finger-receiving portion, or the shield may be between the material that covers the glove and strips of material attached to the glove. In any event, the shield bridges the articulations between sections of padding along the back of the finger-receiving portion of the glove.

[0017] The articulations between sections of padding may be covered or uncovered by the material that covers the glove. When the articulations are covered, some of the material that covers the glove will bunch up at the articulations when the hand is uncurled and stretch out when the hand is curled. Typically in a split-fingered hockey glove, the articulation is uncovered so that the material that covers the glove can be snugly fitted to the padding without bunching when the hand is uncurled.

[0018] In the uncovered arrangement, a shield bridging the articulations will not be covered by the material that covers the glove, thus raising the possibility that the shield could slip out of its position and be lost from the glove. Any suitable means for preventing the shield from slipping out may be used. For example, the shield may be long enough that it cannot slip out from under the material that covers the glove, the shield may be secured in the finger-receiving portion, etc., or a combination thereof.

When the shield is secured in the finger-receiving portion, it is typically secured on one side of the articulation but not the other side since the shield must remain slidable in response to the curling and uncurling of the hand. In one embodiment, the shield is secured at one of its ends, preferably the end near the end of the finger-receiving portion allowing the other end to slide freely. Where a single shield covers more than one articulation, the shield may be secured at the end closest the end of the finger-receiving portion thereby allowing the shield to slide freely over all of the articulations in the finger-receiving portion. Alternatively, two overlapping shields may be used to cover one or more articulations and each shield may be secured to the finger-receiving portion on opposite sides of the articulation. Alternatively, the shield may be formed of telescoping parts and secured to the finger-receiving portion at both ends of the shield on opposite sides of the articulation.

[0019] The shield may be secured by any suitable means, for example, by means of frictional engagement, by means of stitching, by means of an adhesive, etc. or a combination thereof. In one embodiment, the shield is hooked over the end of a finger-receiving portion and frictionally held between the material that covers the glove and the padding of the finger-receiving portion.

[0020] The shield may be made of any suitable material that offers sufficient protection from impact and/or sufficient support against twisting. For example, the shield may be made of plastic (e.g. high-density polyethylene), metal, wood, etc. The shield is preferably a thin strip or plate to minimize bulk. Strips of plastic are preferred.

[0021] Split-fingered gloves of the present invention are particularly useful in contact sports in which sticks are used, for example, hockey, lacrosse, etc. Currently, many split-fingered gloves used in such sports have protective webs of material in the articulations between the padded portions of the finger-receiving portions of the glove. Such protective webs may be used in addition to the shield in gloves of the present

invention. Thus, it is possible, if desired, to retrofit existing split-fingered gloves with a shield to minimize the cost of producing split-fingered gloves of the present invention.

Brief Description of the Drawings

[0022] In order that the invention may be more clearly understood, preferred embodiments thereof will now be described in detail by way of example, with reference to the accompanying drawings, in which:

[0023] Figure 1 is a perspective plan view of a right-handed hockey glove according to one embodiment of the invention in which each finger-receiving portion has one shielded articulation;

[0024] Figure 2 is a side cross-sectional view of a single finger receiving portion of the glove of Figure 1 in an uncurled position;

[0025] Figure 3 is a side cross-sectional view of a single finger receiving portion of the glove of Figure 1 in a curled position;

[0026] Figure 4 is a side cross-sectional view of a single finger-receiving portion of a hockey glove in a curled position according to a second embodiment of the invention in which the finger-receiving portion has two articulations shielded by a single shield;

[0027] Figure 5 is a side cross-sectional view of a single finger-receiving portion of a hockey glove in a curled position according to a third embodiment of the invention in which the finger-receiving portion has two articulations, each articulation being shielded by a separate shield; and,

[0028] Figure 6 is a side cross-sectional view of a single finger-receiving portion of a hockey glove in a curled position according to a fourth embodiment of the invention in which the finger-receiving portion has two articulations shielded by two overlapping shields.

Description of Preferred Embodiments

[0029] Referring to Figure 1, one embodiment of a split-fingered hockey glove of the present invention comprises a hand-receiving portion (generally denoted as **(10)**) which includes a cuff portion **(15)** and a hand portion **(16)**. Extending from the hand-receiving portion is a thumb-receiving portion **(21)** and a finger-receiving portion (generally denoted as **(20)**). The glove, particularly on the back, is padded to provide protection for the hockey player's hand.

[0030] The finger-receiving portion **(20)** comprises four individual finger-receiving portions **(20a, 20b, 20c, 20d)**, one for each of the four fingers and each being individually padded. The padding on the individual finger-receiving portions is discontinuous with the padding on the rest of the glove and discontinuous on the finger-receiving portion itself. Thus, between the finger-receiving portion **(20)** and the hand-receiving portion **(10)** is a first articulation **(18)** in which a first protective web **(19)** is attached. In addition, each of the four individual finger-receiving portions **(20a, 20b, 20c, 20d)** has a second articulation approximately in the location of a finger joint. The back of each individual finger-receiving portion is well padded forward of and to the rear of each second articulation, however, the second articulation itself does not enjoy padding to the same extent thereby exposing the finger joint to injury. Therefore, each finger joint is protected by individual shields **(25a, 25b, 25c, 25d)** disposed over the second articulations and slidably engaged with each individual finger-receiving portion. The manner in which the shields are engaged with the finger-receiving portions is discussed below with reference to Figures 4 and 5. Each second articulation of the individual finger-receiving portions has attached therein a second protective web (for example, **(27a)**) for added protection for the finger joints. The first articulation and the second articulations give the glove greater flexibility so that a player can more easily curl and uncurl the hand. The shields **(25a, 25b, 25c, 25d)** provide protection to the finger joints, especially when the hand is curled around a stick, as in a hockey game.

[0031] Referring to Figures 2 and 3, Figure 2 is a side cross-sectional view of a single finger receiving portion of the glove of Figure 1 in an uncurled position and Figure 3 is a side cross-sectional view of a single finger receiving portion of the glove of Figure 1 in a curled position. A finger-receiving portion **(20a)** comprises a padded proximal/medial segment **(31)** and a padded distal segment **(32)**. The proximal/medial segment **(31)** is separated from the hand-receiving portion **(10)** of the glove by a first articulation **(18)** having a first protective web **(19)** attached therein. The proximal/medial segment **(31)** is separated from the distal segment **(32)** by a second articulation having a second protective web **(27a)** attached therein. The finger-receiving portion **(20a)** also comprises a finger sheath **(35)** in which a finger may be inserted. The finger-receiving portion **(20a)**, as well as the entire glove, is covered by an outer cover **(37)**, generally made of a durable material such as leather, nylon and/or other typical glove covering material.

[0032] A thin, but durable, plastic shield **(25a)** covers the second articulation to provide protection for the finger joint at the second articulation. The shield **(25a)** is a single strip of plastic with a bent portion **(26a)** at the distal end, which hooks over the end of the padding of the distal segment **(32)** of the finger-receiving portion **(20a)**. The shield **(25a)** is held snugly between the padding of the distal **(32)** and proximal/medial **(31)** segments and the outer cover **(37)**, which is stretched over the padding.

[0033] When the finger-receiving portion **(20a)** is in the uncurled position as depicted in Figure 2, the shield **(25a)** covers the second articulation and extends along the back of the padding of the proximal/medial segment **(31)** most of the way to the first articulation **(18)**. When the hand is curled and the finger-receiving portion **(20a)** is curled as depicted in Figure 3, the shield **(25a)** slides between the outer cover **(37)** and the padding in response to the curling motion of the finger. Sliding of the shield **(25a)** in this manner is permitted since the shield **(25a)** is frictionally secured at the distal end of the finger-receiving portion by means of the bent portion **(26a)** hooked over the padding

of the distal segment **(32)** while the proximal end of the shield **(25a)** is not secured. It can be seen by comparing Figure 2 to Figure 3 that the proximal end of the shield **(25a)** is closer to the second articulation when the finger-receiving portion **(20a)** is curled than when it is not curled. The shield **(25a)** is long enough that it will not slip out into the second articulation when the finger-receiving portion **(20a)** is fully curled even though the shield has slid substantially closer to the second articulation and the size of the gap of the second articulation increases upon curling. Thus, the shield **(25a)** still covers the second articulation thereby continuing to protect the finger joint and provide support against twisting of the distal segment **(32)** of the finger-receiving portion **(20a)**. It can be seen from Figure 3 that the outer covering **(37)** forms a bunch **(38)** on the inner radius of the curl when the finger-receiving portion **(20a)** is curled.

[0034] Figure 4 is a side cross-sectional view of a single finger-receiving portion of a hockey glove in a curled position according to a second embodiment of the invention in which the finger-receiving portion **(120a)** has two articulations shielded by a single shield. The finger-receiving portion comprises a padded proximal segment **(130)**, a padded medial segment **(131)** and a padded distal segment **(132)**. A first articulation **(118)** having a first protective web **(119)** attached therein separates the proximal segment **(130)** from a hand-receiving portion **(110)** of the glove. A second articulation having a second protective web **(127a)** at about the proximal interphalangeal (PIP) joint of a finger separates the proximal segment **(130)** from the medial segment **(131)**. A third articulation having a third protective web **(128a)** at about the distal interphalangeal (DIP) joint of the finger separates the medial segment **(131)** from the distal segment **(132)**. The finger-receiving portion **(120a)** also comprises a finger sheath **(135)** in which a finger may be inserted. The finger-receiving portion **(120a)**, as well as the entire glove, is covered by an outer cover **(137)**, generally made of a durable material such as leather, nylon and/or other typical glove covering material.

[0035] A shield (**125a**) made from a single, thin, durable strip of plastic covers both the second and third articulations. In a manner similar to that described in relation to Figures 4 and 5, the shield (**125a**) has a bent portion (**126a**), which hooks over the distal end of the padding of the distal segment (**132**) and is thereby frictionally secured at the distal end since the shield (**125a**) is held in place between the padding and the outer cover (**137**). The proximal end of the shield (**125a**) is not secured and slides between the outer cover (**137**) and the padding when the finger-receiving portion is curled and uncurled in response to curling and uncurling of a hand. The shield (**125a**) always covers the second and third articulations, even in the most extremely curled positioned since it is long enough that the proximal end does not slip out into the second articulation upon curling of the finger-receiving portion (**120a**).

[0036] Figure 5 is a side cross-sectional view of a single finger-receiving portion of a hockey glove in a curled position according to a third embodiment of the invention in which the finger-receiving portion (**220a**) has two articulations, each articulation being shielded by a separate shield. The finger-receiving portion comprises a padded proximal segment (**230**), a padded medial segment (**231**) and a padded distal segment (**232**). A first articulation (**218**) having a first protective web (**219**) attached therein separates the proximal segment (**230**) from a hand-receiving portion (**210**) of the glove. A second articulation having a second protective web (**227a**) at about the proximal interphalangeal (PIP) joint of a finger separates the proximal segment (**230**) from the medial segment (**231**). A third articulation having a third protective web (**228a**) at about the distal interphalangeal (DIP) joint of the finger separates the medial segment (**231**) from the distal segment (**232**). The finger-receiving portion (**220a**) also comprises a finger sheath (**235**) in which a finger may be inserted. The finger-receiving portion (**220a**), as well as the entire glove, is covered by an outer cover (**237**), generally made of a durable material such as leather, nylon and/or other typical glove covering material.

[0037] A proximal interphalangeal shield **(224a)** covers the second articulation to protect the proximal interphalangeal (PIP) joint of a finger and to provide support against twisting of the medial segment **(231)**. The proximal interphalangeal shield **(224a)** is held in position between the outer cover **(237)** and the padding of the proximal **(230)** and medial **(231)** segments. The distal end of the proximal interphalangeal shield **(224a)** is secured by means of stitching so that only the proximal end slides when the finger-receiving portion **(220a)** is curled. The proximal interphalangeal shield **(224a)** is long enough that it will not slip out into the second articulation at the most extremely curled position of the finger-receiving portion **(220a)**.

[0038] A distal interphalangeal shield **(225a)** covers the third articulation to protect the distal interphalangeal (DIP) joint of a finger and to provide support against twisting of the distal segment **(232)**. The distal interphalangeal shield **(225a)** is held in position between the outer cover **(237)** and the padding of the medial **(231)** and distal **(232)** segments. The distal end of the distal interphalangeal shield **(225a)** is frictionally secured by means of a bent portion **(226a)**, which hooks over the distal end of the padding of the distal segment **(232)** so that only the proximal end of the distal interphalangeal shield **(225a)** slides when the finger-receiving portion **(220a)** is curled. The distal interphalangeal shield **(225a)** is long enough that it will not slip out into the third articulation at the most extremely curled position of the finger-receiving portion **(220a)**.

[0039] Figure 6 is a side cross-sectional view of a single finger-receiving portion of a hockey glove in a curled position according to a fourth embodiment of the invention in which the finger-receiving portion **(320a)** has two articulations shielded by two overlapping shields. The finger-receiving portion comprises a padded proximal segment **(330)**, a padded medial segment **(331)** and a padded distal segment **(332)**. A first articulation **(318)** separates the proximal segment **(330)** from a hand-receiving portion **(310)** of the glove. A second articulation **(327a)**, without a protective web, at

about the proximal interphalangeal (PIP) joint of a finger separates the proximal segment **(330)** from the medial segment **(331)**. A third articulation **(328a)**, without a protective web, at about the distal interphalangeal (DIP) joint of the finger separates the medial segment **(331)** from the distal segment **(332)**. The finger-receiving portion **(320a)** also comprises a finger sheath **(335)** in which a finger may be inserted. The finger-receiving portion **(320a)**, as well as the entire glove, is covered by an outer cover **(337)**, generally made of a durable material such as leather, nylon and/or other typical glove covering material.

[0040] A first shield **(324a)** covers both the second articulation **(327a)** and the third articulation **(328a)** to protect both the proximal interphalangeal (PIP) and distal interphalangeal (DIP) joints of a finger and to provide support against twisting of the medial **(331)** and distal **(332)** segments. The proximal end of the first shield **(324a)** is frictionally secured by means of a bent portion, which hooks over the proximal end of the padding of the proximal segment **(330)** so that only the distal end of the first shield **(324a)** slides when the finger-receiving portion **(320a)** is curled. A second shield **(325a)** overlaps the first shield **(324a)** and covers both the second articulation **(327a)** and the third articulation **(328a)** to protect both the proximal interphalangeal (PIP) and distal interphalangeal (DIP) joints of a finger and to provide support against twisting of the medial **(331)** and distal segment **(332)**. The distal end of the second shield **(325a)** is frictionally secured by means of a bent portion, which hooks over the distal end of the padding of the distal segment **(332)** so that only the proximal end of the second shield **(325a)** slides when the finger-receiving portion **(320a)** is curled. Both the first shield **(324a)** and the second shield **(325a)** are constrained by and slidable within a sleeve **(340)** of material sewn onto the outer cover **(337)** on the back of the of the finger-receiving portion **(320a)**.

[0041] It will be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and sub-combinations. This is contemplated by and is within the scope of the claims.

[0042] Since many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

[0043] Having described the invention, what is claimed is: